

FUSIBLE POLYVINYLCHLORIDE PIPE

PART 1 –GENERAL

1.01 DESCRIPTION

A SCOPE

1. This section specifies fusible polyvinylchloride pipe, including standards for dimensionality, testing, quality, acceptable fusion practice, safe handling and storage.

B PIPE DESCRIPTION

1. Contractor shall furnish fusible polyvinylchloride pipe conforming to all standards and procedures, and meeting all testing and material properties as described in this specification.
2. Fusible polyvinyl chloride pipe shall conform to the same sizing convention, inside diameter, dimensional tolerances and pressure class of the pipe being joined”

C MANUFACTURER REQUIREMENTS

1. All piping shall be made from PVC compound conforming to cell classification 12454 per ASTM D1784.

D FUSION TECHNICIAN REQUIREMENTS

1. Fusion Technician shall be fully qualified by the pipe supplier to install fusible polyvinylchloride pipe of the type(s) and size(s) being used. Qualification shall be current as of the actual date of fusion performance on the project.

E SPECIFIED PIPE SUPPLIERS

1. Fusible polyvinylchloride pipe shall be used as manufactured under the trade names Fusible C-900®, Fusible C-905®, and FPVC®, for Underground Solutions, Inc., Poway, CA, (858) 679-9551. Fusion process shall be as patented by Underground Solutions, Inc., Poway, CA, Patent No. 6,982,051. Owner and engineer are aware of no other supplier of fusible polyvinylchloride pipe that is an equal to this specified pipe supplier and products.

F PRE-CONSTRUCTION SUBMITTALS

1. The following PRODUCT DATA is required from the pipe supplier and/or fusion provider:

- 1) Pipe Size
- 2) Dimensionality
- 3) Pressure Class per applicable standard
- 4) Color
- 5) Recommended Minimum Bending Radius
- 6) Recommended Maximum Safe Pull Force
- 7) Fusion technician qualification indicating conformance with this specification

G POST-CONSTRUCTION SUBMITTALS

1. The following AS-RECORDED DATA is required from the contractor and/or fusion provider to the owner or pipe supplier upon request:
 - 1) Approved datalogger device reports
 - 2) Fusion joint documentation containing the following information:
 - a) Pipe Size and Thickness
 - b) Machine Size
 - c) Fusion Technician Identification
 - d) Job Identification
 - e) Fusion Joint Number
 - f) Fusion, Heating, and Drag Pressure Settings
 - g) Heat Plate Temperature
 - h) Time Stamp
 - i) Heating and Cool Down Time of Fusion
 - j) Ambient Temperature

PART 2 – PRODUCTS

2.01 FUSIBLE POLYVINYLCHLORIDE PRESSURE PIPE FOR POTABLE WATER

- A Fusible polyvinylchloride pipe shall conform to AWWA C900, AWWA C905, ASTM D2241 or ASTM D1785 for standard dimensions, as applicable. Testing shall be in accordance with the referenced AWWA standards for all pipe types.
- B Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.
- C Fusible polyvinylchloride pipe shall be manufactured in a standard 40' nominal length, or custom lengths as specified.

- D Fusible polyvinylchloride pipe shall be blue in color for potable water use.
- E Pipe shall be marked as follows:
 - 1. Nominal pipe size
 - 2. PVC
 - 3. Dimension Ratio, Standard Dimension Ratio, or Schedule
 - 4. AWWA pressure class, or standard pressure rating for non-AWWA pipe, as applicable
 - 5. AWWA standard designation number, or pipe type for non-AWWA pipe, as applicable
 - 6. NSF-61 mark verifying suitability for potable water service
 - 7. Extrusion production-record code
 - 8. Trademark or trade name
 - 9. Cell Classification 12454 and/or PVC material code 1120 may also be included
- F Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

2.02 FUSION JOINTS

- A Unless otherwise specified, fusible polyvinylchloride pipe lengths shall be assembled in the field with butt-fused joints. The Contractor shall follow the pipe supplier's written guidelines for this procedure. All fusion joints shall be completed as described in this specification.

PART 3 - EXECUTION

3.01 DELIVERY AND OFF-LOADING

- A All pipe shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the owner or engineer.
- B Each pipe shipment should be inspected prior to unloading to see if the load has shifted or otherwise been damaged. Notify owner or engineer immediately if more than immaterial damage is found. Each pipe shipment should be checked for quantity and proper pipe size, color, and type.
- C Pipe should be loaded, off-loaded, and otherwise handled in accordance with AWWA M23, and all of the pipe supplier's guidelines shall be followed.
- D Off-loading devices such as chains, wire rope, chokers, or other pipe handling implements that may scratch, nick, cut, or gouge the pipe are strictly prohibited.
- E During removal and handling, be sure that the pipe does not strike anything. Significant impact could cause damage, particularly during cold weather.
- F If appropriate unloading equipment is not available, pipe may be unloaded by

removing individual pieces. Care should be taken to insure that pipe is not dropped or damaged. Pipe should be carefully lowered, not dropped, from trucks.

3.02 HANDLING AND STORAGE

- A Any length of pipe showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work. Damaged areas, or possible areas of damage may be removed by cutting out and removing the suspected incident fracture area. Limits of the acceptable length of pipe shall be determined by the owner or engineer.
- B Any scratch or gouge greater than 10% of the wall thickness will be considered significant and can be rejected unless determined acceptable by the owner or engineer.
- C Pipe lengths should be stored and placed on level ground. Pipe should be stored at the job site in the unit packaging provided by the manufacturer. Caution should be exercised to avoid compression, damage, or deformation to the ends of the pipe. The interior of the pipe, as well as all end surfaces, should be kept free from dirt and foreign matter.
- D Pipe shall be handled and supported with the use of woven fiber pipe slings or approved equal. Care shall be exercised when handling the pipe to not cut, gouge, scratch or otherwise abrade the piping in any way.
- E If pipe is to be stored for periods of 1 year or longer, the pipe should be shaded or otherwise shielded from direct sunlight. Covering of the pipe which allows for temperature build-up is strictly prohibited. Pipe should be covered with an opaque material while permitting adequate air circulation above and around the pipe as required to prevent excess heat accumulation.
- F Pipe shall be stored and stacked per the pipe supplier's guidelines.

3.03 FUSION PROCESS

A GENERAL

1. Fusible polyvinylchloride pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's guidelines.
2. Fusible polyvinylchloride pipe will be fused by qualified fusion technicians, as documented by the pipe supplier.
3. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine.
4. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process. Fusion machines must incorporate the following elements:
 - a) HEAT PLATE - Heat plates shall be in good condition with no deep

gouges or scratches. Plates shall be clean and free of any debris or contamination. Heater controls shall function properly; cord and plug shall be in good condition. The appropriately sized heat plate shall be capable of maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused, per the pipe supplier's guidelines.

- b) CARRIAGE – Carriage shall travel smoothly with no binding at less than 50 psi. Jaws shall be in good condition with proper inserts for the pipe size being fused. Insert pins shall be installed with no interference to carriage travel.
 - c) GENERAL MACHINE - Overview of machine body shall yield no obvious defects, missing parts, or potential safety issues during fusion.
 - d) DATA LOGGING DEVICE – An approved datalogging device with the current version of the pipe supplier's recommended and compatible software shall be used. Datalogging device operations and maintenance manual shall be with the unit at all times. If fusing for extended periods of time, an independent 110V power source shall be available to extend battery life.
5. Other equipment specifically required for the fusion process shall include the following:
- a) Pipe rollers shall be used for support of pipe to either side of the machine
 - b) A weather protection canopy that allows full machine motion of the heat plate, fusion assembly and carriage shall be provided for fusion in inclement, extreme temperatures, and /or windy weather, per the pipe supplier's recommendations.
 - c) An infrared (IR) pyrometer for checking pipe and heat plate temperatures.
 - d) Fusion machine operations and maintenance manual shall be kept with the fusion machine at all times.
 - e) Facing blades specifically designed for cutting fusible polyvinylchloride pipe shall be used.

B JOINT RECORDING

Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine. The fusion data logging and joint report shall be generated by software developed specifically for the butt-fusion of fusible polyvinyl chloride pipe. The software shall register and/or record the parameters required by the pipe supplier and these specifications. Data not logged by the data logger shall be logged manually and be included in the Fusion Technician's joint report.

3.04 GENERAL INSTALLATION

- A Installation guidelines from the pipe supplier shall be followed for all installations.
- B The fusible polyvinylchloride pipe will be installed in a manner so as not to exceed the recommended bending radius.
- C Where fusible polyvinylchloride pipe is installed by pulling in tension, the recommended Safe Pulling Force established by the pipe supplier shall not be exceeded.

****END OF SECTION****